Space Weather Forecast

Issued on Saturday 1 February 2025 at 01:09 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1 Minor Storms likely day 1-2 (01-02 Feb) from fast winds and potential coronal mass ejection glance. Further Moderate class flares expected.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with three Moderate class flares observed from the northeast complex of spots. This has been analysed as three distinct sunspot regions, however they form a large area of many small individual spots with a complex magnetic structure that has ongoing development and interactivity with each other. The other regions remained small and simple.

A coronal mass ejection (CME) was observed leaving the Sun due to strongest of the flares from the northeast disc, occurring at 31/1406 UTC. This remains under analysis for any Earth-directed component, but is most likely missing behind and to the north.

Solar Wind / Geomagnetic Activity: Solar winds showed a gradual and erratic connection to the fast winds from a coronal hole. Solar wind speed was initially background 300-350 km/s, then rose from 31/1930 UTC to be slightly elevated at 420-450km/s by the end of the period. Interplanetary Magnetic Field showed an erratic increasing trend from Moderate to be Strong by the end of the period. The north-south component was mainly Moderate to Strongly positive (northward), but with periods of Moderate negative southward) values. Geomagnetic activity was mainly quiet (Kp 0-2) but Unsettled (Kp 3) 31/2100-0000 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate solar activity is expected with a chance of isolated Moderate flares, primarily from the regions on the northeast disc.

Solar Wind / Geomagnetic Activity: The CME from 30/1400 UTC has been reassessed as likely giving a glancing impact on day 2 (02 Feb), although with low confidence. Otherwise the fast solar winds from a coronal hole, which Earth is currently moving into, are expected to dominate the forecast. These bringing Elevated solar winds (500-600 km/s) later day 1 and through day 2 (01-02 Feb) before easing day 3-4 (03-04 Feb). Geomagnetic activity is expected to become Unsettled to Active with a likelihood of G1 Minor storms day 1 (01 Feb). This potential continues day 2 (02 Feb)

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due to any potential CME glance and the ongoing fast winds, before receding days 3-4 (03-04 Feb) to be mainly Quiet to Unsettled with isolated Active intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background with no solar radiation storms forecast. However, there is a slightly increased potential from day 2 the complex of sunspots in the northeast disc move east across the visible solar disc.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	40	20	5
Strong	G3	No	1	10	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	75	75	75	75
Very Active	R3-R5 (X Class)	No	15	15	15	15

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	10	10	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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